

CLAIMS

1. A cordless power tool comprising:
a cordless power tool having a housing including a mechanism for coupling with a removable battery pack;
said removable battery pack comprising a housing with one or more cells in said housing, a vent system in said battery pack housing for enabling fluid passage through said housing; and
a mechanism associated with said battery pack for dissipating heat from said battery pack.
- 5 2. The cordless tool according to Claim 1, wherein said mechanism includes fluid directors for moving fluid to said one or more cells.
3. The cordless tool according to Claim 1, wherein said mechanism includes a heat sink for dissipating heat from said one or more cells.
4. The cordless tool according to Claim 1, wherein said mechanism includes a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.
5. The cordless tool according to Claim 4, wherein said fan is in said tool housing.
6. The cordless tool according to Claim 4, wherein said fan is in said battery pack housing.

7. The cordless tool according to Claim 1, further comprising a battery charger for charging said battery pack, said battery recharger having a mechanism for moving fluid through said vent system of said battery pack housing.

8. The cordless tool according to Claim 7, wherein said charger includes a fan for forcing fluid through said vent system.

9. The cordless tool according to Claim 7, wherein said battery pack housing has a fan and said charger has a vent system enabling fluid to be passed through said battery pack vent system.

10. The cordless tool according to Claim 7, wherein said charger includes a vent system and an auxiliary fan is coupled with said charger or battery pack housing for moving fluid through said battery pack housing.

11. The cordless tool according to Claim 1, further including a heat pump for providing cooling and heating of said one or more cells in said battery pack housing.

12. The cordless tool according to Claim 1, wherein said mechanism includes a sensor for sensing temperature of said one or more cells and a heat dissipator for equalizing the temperature of said plurality of cells.

13. The cordless tool according to Claim 12, said heat dissipator wicks heat from hotter cells to ambient or to other cells to equalize cell temperature.

14. The cordless tool according to Claim 1, wherein said mechanism includes fluid directors for moving fluid around higher temperature cells of said one or more cells and a heat sink for dissipating heat from higher temperature cells of said one or more cells.

15. The cordless tool according to Claim 1, wherein said mechanism includes fluid directors for moving fluid around higher temperature cells of said plurality of cells and a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

16. The cordless tool according to Claim 1, wherein said mechanism includes a heat sink for dissipating heat from higher temperature cells of said one or more cells and a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

17. The cordless tool according to Claim 15, wherein said fan is in said tool housing.

18. The cordless tool according to Claim 16, wherein said fan is in said tool housing.

19. The cordless tool according to Claim 15, wherein said fan is in said battery pack housing.

20. The cordless tool according to Claim 16, wherein said fan is in said battery pack housing.

21. The cordless tool according to Claim 14, further comprising a battery charger for charging said battery pack, said battery charger having a mechanism for moving fluid through said vent system of said battery pack housing.

22. The cordless tool according to Claim 21, wherein said charger includes a fan for forcing fluid through said vent system.

23. The cordless tool according to Claim 14, wherein said battery pack housing has a fan and said charger has a vent system enabling fluid to be passed by said one or more cells.

24. The cordless tool according to Claim 14, wherein said charger includes a vent system and an auxiliary fan is coupled with said charger or battery pack housing for moving fluid through said battery pack.

25. The cordless tool according to Claim 15, further comprising a battery charger for charging said battery pack, said battery charger having a mechanism for moving fluid through said vent system of said battery pack housing.

26. The cordless tool according to Claim 16, further comprising a battery charger for charging said battery pack, said battery charger having a mechanism for moving fluid through said vent system of said battery pack housing.

27. A removable battery pack comprising:

a housing with one or more cells in said housing, a vent system in said housing for enabling fluid passage through said housing; and

a mechanism associated with said battery pack for dissipating heat in said battery pack housing.

28. The removable battery pack according to Claim 27, wherein said mechanism includes fluid directors for moving fluid to said one or more cells.

29. The removable battery pack according to Claim 27, wherein said mechanism includes a heat sink for dissipating heat from said one or more cells.

30. The removable battery pack according to Claim 27, wherein said mechanism includes a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

31. The removable battery pack according to Claim 27, further including a heat pump for providing cooling and heating of said one or more cells in said battery pack housing.

32. The removable battery pack according to Claim 27, wherein said mechanism includes a sensor for sensing temperature of said one or more cells and a heat dissipator for equalizing the temperature of said plurality of cells.

33. The removable battery pack according to Claim 27, wherein said mechanism includes fluid directors for moving fluid around higher temperature cells of said one or more cells and a heat sink for dissipating heat from higher temperature cells of said one or more cells.

34. The removable battery pack according to Claim 27, wherein said mechanism includes fluid directors for moving fluid around higher temperature cells of said plurality of cells and a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

35. The removable battery pack according to Claim 27, wherein said mechanism includes a heat sink for dissipating heat from higher temperature cells of said one or more cells and a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

36. A battery charger comprising:
a housing;
a mechanism for electrically coupling with a chargeable battery;
a power source coupled with said mechanism; and
a mechanism in the housing for moving fluid through a vent system of a battery pack.

37. The battery charger according to Claim 36, wherein said charger includes a fan for forcing fluid through said vent system.

38. The battery charger according to Claim 36, wherein said charger includes a vent system and an auxiliary fan is coupled with said charger or battery pack housing for moving fluid through said battery pack housing.

39. An auxiliary fluid mover for cooling a rechargeable battery pack, comprising:

a housing;

5 a mechanism for electrically coupling with a battery pack, said mechanism coupled with said housing;

a mechanism for electrically coupling with a charger, said mechanism coupled with said housing;

a vent system for directing fluid to a battery pack; and

10 a mechanism for moving fluid through said housing into a battery pack.

40. The auxiliary fluid mover according to Claim 39, further including a heat pump for providing cooling and heating of said one or more cells in said battery pack housing.

41. The auxiliary fluid mover according to Claim 39, wherein said mechanism includes a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

42. The auxiliary fluid mover according to Claim 40, wherein said mechanism includes a fan for forcing fluid through said vent system to dissipate heat from the battery pack housing.

43. A cordless power tool comprising:
a cordless power tool having a mechanism for coupling with a removable battery pack;
said removable battery pack comprising a housing with a plurality
5 of cells in said housing; and
a mechanism in said housing coupled with said plurality of cells for equalizing temperature of said plurality of cells.

44. The cordless tool according to Claim 43, wherein said mechanism coupled with said cells including a heat sink for equalizing temperature of said cells in said housing.

45. The cordless tool according to Claim 44, wherein said heat sink has an increased concentration in area having higher temperature cells.

46. The cordless tool according to Claim 45, wherein said heat sink includes a thermal conductive medium surrounding said cells, a base, and fins.

47. The cordless tool according to Claim 44, wherein said battery pack housing includes apertures for dissipating heat.

48. A removable battery pack comprising:
a cordless power tool having a mechanism for coupling with a removable battery pack;
said removable battery pack comprising a housing with a plurality
5 of cells in said housing; and
a mechanism in said housing coupled with said plurality of cells for equalizing temperature of said plurality of cells.

49. The removable battery pack according to Claim 48, wherein said mechanism coupled with said cells including a heat sink for equalizing temperature of said cells in said housing.

50. The removable battery pack according to Claim 49, wherein said heat sink has an increased concentration in area having higher temperature cells.

51. The removable battery pack according to Claim 50, wherein said heat sink includes a thermal conductive medium surrounding said cells, a base, and fins.

52. The removable battery pack according to Claim 49, wherein said battery pack housing includes apertures for dissipating heat.

53. A battery pack temperature change mechanism comprising:
a housing;
a mechanism in the housing for moving fluid through a vent
system of a battery pack; and
5 a power source coupled with said fluid moving mechanism.

54. The battery pack temperature change mechanism according to
Claim 53, wherein said fluid moving mechanism includes a fan for forcing fluid
through said vent system.

55. The battery pack temperature change mechanism according to
Claim 53, wherein said fluid moving mechanism includes a vent system in said
housing.

56. The battery pack temperature change mechanism according to
Claim 53, further comprising a switch for activating the fluid moving
mechanism.

57. The battery pack temperature change mechanism according to
Claim 56, wherein said switch is manually activated.

58. The battery pack temperature change mechanism according to
Claim 56, wherein said switch is automatically activated when said battery
pack is coupled with said housing.